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Indian Museum Notes

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G. V. RILEY
WASHINGTON,
D. C.

INDIAN MUSEUM NOTES.

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CONTENTS OF VOL. III, No 3.

	PAGE
A NEW COCCID FROM CEYLON, by G. B. Buckton, F.R.S.	103
A NEW SPECIES OF FULGORIDÆ, by M. Lethierry	105
A NEW ENEMY OF THE CUSTARD APPLE, translation by F. Moore	106
NOTES ON INDIAN APHIDÆ, by G. B. Buckton, F.R.S.	108
MISCELLANEOUS NOTES FROM THE ENTOMOLOGICAL SECTION, by E. C. Cotes	110

A NEW COCCID FROM CEYLON.

BY G. B. BUCKTON, F.R.S.

Orthezia nacreæ.⁽¹⁾

In March 1893 I received from Ceylon a consignment of twigs and leaves of *Crossandra* which were incrustated by a white semi-flocculent matter, which proved to be the exudation of a species of *Orthezia*, apparently undescribed. Of this Coccus I give the following description. Unfortunately the specimens arrived in a bad condition from the effects of mildew, which rendered the examination less complete than could be wished.



Female.—Not scaly-form. Wingless, but capable of slow locomotion. General shape long-oval or cylindrical. Head and thoracic portion pale warm brown. Rest of the insect, except the legs and rostrum, shining satiny white, with a porcelain-like surface. In some lights this gives nacreous tints. Head small, antennæ short and black, rather stout and about the length of the pronotum. The two basal joints the thickest, followed by six subequal tapering joints. Some of these are attenuated in the middle, thus simulating extra joints. The apex somewhat mammi-form and without bristles. Eyes small, black, and placed just behind the antennæ. Legs black and rather long, tarsus single-jointed, but

(1) This insect, which was forwarded to the Indian Museum through Mr. E. E. Green in January 1893, has proved very troublesome in the Botanical Gardens at Peradenuja, Ceylon, where it has been multiplying with great rapidity. From notes furnished by Dr. Trimen, F.L.S., it appears that it especially attacks *Acanthaceæ*, which include some of the most showy plants in the garden.

showing some tendency to a sub-division. Claw single. Rostrum short, stout, black, furnished with a long seta (? more than one), and placed between the coxæ. Pronotum fuscous, separate from the abdomen and furnished with two rows of dark spots. The lower border of the pronotum ends by several foliated cereus laminae, pointed at their ends, and one overlapping the other somewhat like the scapular feathers of a bird's wing.

The white plates only partially cover the abdomen which becomes a marsupium or cradle to protect the twenty or thirty black eggs which hatch within the dead body of the parent, and find therein a secure covering until they are sufficiently grown to migrate over the food plant. The lower part of the abdomen is smooth and cylindrical, but the upper part is deeply furrowed or channeled into bundles of striæ. The sternum is slightly spotted.

Size female with the marsupium 0.16×0.05 of an inch.

An examination of the male is desirable. Doubtless it is winged. Attention should be called to the anal filaments, which in *Orthezia*, unlike other known Coccidæ, have numbered two instead of four. Mr. Douglas has so figured the male of *Orthezia insignis* (see Ent. Mon. Mag., Vol. XXIV, p. 169). This insect, which has close relations to the Ceylon insect, was first found on *Strobilanthus*, a Chinese plant growing in the economic houses at Kew Gardens.

I think the insect above described is distinct. The Kew insect is much larger (♀), its body is piceous black, and the thoracic laminae are developed in a single instead of a double row. Observers on the spot have peculiar facilities for studying the economy and life histories of such insects. As the dipterous male insects of Cocco are very active, and they usually live only a few days in the early season of the year, attention and address will be required to secure them.

The Kew insect appears to be spreading over the hot houses of England and seems to be very difficult to annihilate. It does as much mischief as the more common "mealy bug."

EXPLANATION OF FIGURES.

FIG. 1.—Female, with the black eggs appearing through the cover of the marsupium.

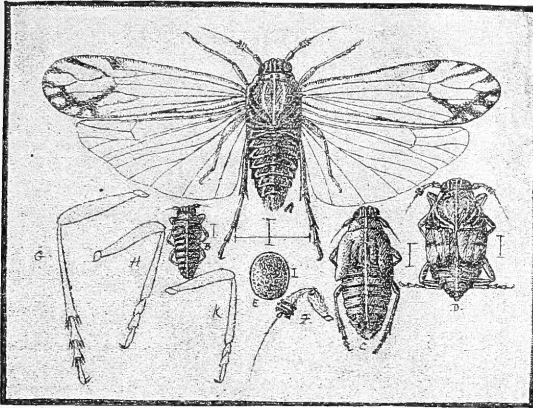
FIG. 2.—Hind legs with tarsus and claw.

FIG. 3.—Antenna.



A NEW SPECIES OF FULGORIDÆ.

BY MONS. LETHIERRY.

Delphax psylloides(¹).

Caput thorace paulo longius, ante oculos paulo prominens, supra stramineum, subtus opacum, fuscum: vertice oculo uno æquali, basi excavato, carinis apicalibus acutis, prominentibus: fronte subelongatâ, carinâ distinctâ percurrente, basi furcatâ: clypeo medio distincte carinato: antennarum articulo primo flavo, apice nigro, secundo flavo, basi nigro, ultimis nigris. Pronotum et scutellum tricarinata, pallida, marginibus fuscis aut obscure stramineis, vittisque duabus disci longitudinalibus stramineis. Tegmina abdomine duplo longiora, hyalina, margine imo commissurali clavi, maculâ parvâ quadratâ marginali pone medium, necnon margine apicali superno (hoc hyalino-trifenestrato) nigris: venis apice nigris, discoidali mediâ apice furcatâ. Abdomen nigrum, lateribus segmentorum dorsalium pallido-maculatis. Femoribus nigris aut fuscis, tibiis et tarsis albo-pallidis.

Long. (eum tegminibus) 5 millim. ♂ ♀.

Formâ verticis D. Fairmairei Perris, affinis: picturâ tegminum insignis.

Ceylon.

(¹) The species was forwarded from Ceylon by Mr. E. E. Green, and the following particulars are taken from the interesting notes he has furnished regarding it. The insect is to be found in its various stages of growth swarming within the clasping sheaths of the leaves of the Indian corn plant (*Zea mays*). In wet weather it is accompanied by a sooty fungus which has not been noticed at other times. It is also attended by ants. The eggs are buried in the tissues of the plant on the inside of the sheathing leaves, the orifice being concealed by a deposit of white woolly secretion. The effect upon the plants depends upon the period at which they are attacked. If attacked when young, they are stunted and weakened. Older, well-established plants do not suffer so much.

Nympha: flava, tribus segmentis ultimis dorsalibus ad latera nigromaculatis.

[The following is an explanation of the figure, which has been prepared by the Museum artist. A, imago; B, C, and D, larvæ in various stages of development; E, egg; F, antenna of imago; G, H, and K, hind leg, second leg and front leg of imago. The natural sizes of the various stages are indicated by hair lines.—*Ed.*]

A NEW ENEMY OF THE CUSTARD-APPLE.⁽¹⁾

TRANSLATED BY F. MOORE, F.L.S.

Family Phycitidæ Genus nov. Anonæpestis, Ragonot.

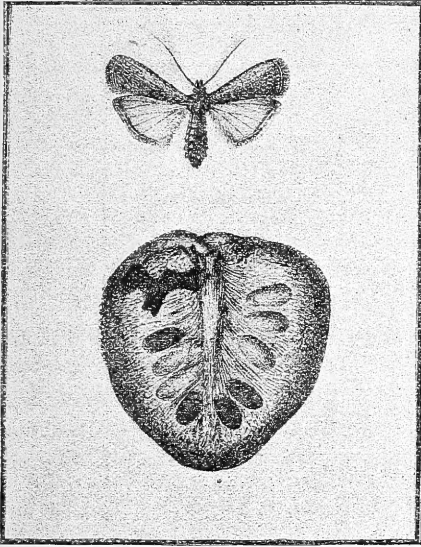
Female.—Face smooth, rounded. Antennæ of female slightly flattened. Tongue well developed. Palpi ascending, curved, somewhat oblique, thin, smooth, rather short, not reaching the vertex, the third joint nearly as long and as broad as the second, obliquely cut at the apex. Maxillary palpi scaly, flattened against the face. Body moderate, the abdomen reaching one-third of its length beyond the hindwings. Legs strong, flattened. *Forewings* subtriangular, narrow at the base, the costa very slightly arched, the hind margin and angles much rounded, slightly oblique; with eleven veins; cell reaching three-fifths of the length of wing, slightly concave at extremity; vein, 2 near the angle; vein 3 from the angle, curved, parallel with 3 and 4, veins 4 and 5 appearing stemmed, but in reality separate, originating from the angle of the cell and in a line with the median vein; vein 6 from below the upper angle, veins 8 and 9 stemmed; veins 10 and 11 from the cell. *Hindwings* nearly triangular, slightly sinuous below the apex; with seven veins; cell short, one-fourth of the wing; veins 7 and 8 long coalescing a short distance, vein 7 afterwards joined to 6; vein 5 free running very close to 3 and appearing stemmed with it; vein 2 very close to the angle; vein 4 wanting.

This genus, described on a unique female specimen, appears distinct from all others on account of the peculiar disposition of veins 2, 3, and 4 of the hindwings. It seems to partake of the characters of *Psorosa* and *Heterographis*. No doubt the male has peculiar palpi and antennæ.

(1) The specimen upon which the genus and species are founded was reared in the Museum from caterpillars found tunnelling into the fruit of the custard-apple (*Anona squamosa*) in Calcutta. The insect proved to be new to the Indian Museum collection, so was forwarded to Lord Walsingham, who submitted it to Mr. F. Moore. Mr. Moore writes:—"The moth from the custard-apple is also a Phycid, the specimen sent home being that of a female. This has been kindly examined and described for me by my friend Mons. Ragonot, who has characterised it as belonging to a new genus and species of Phycitidæ, to which he has given the names of *Anonæpestis bengalella*, and of which I herein send you an English description for publication in your Museum Notes." As the female only has yet been described, it would be desirable to procure the male.—*Ed.*

ANONÆPESTIS BENGALELLA, Ragonot, n. sp.

Female.—Length 22 mill. Forewings dark green, darker in basal area, the costa, in middle area, broadly pale yellow, with a greenish tinge, the dorsal half broadly purple, turning to dark violet on the inner margin of the median area; marginal dots black, large and distinct, placed between a series of pale longitudinal streaks in the terminal area, on the veins. Cilia fuscous, shining, pale brownish at the base, the extreme base of the wing also pale brownish. Lines distinct, pale greenish yellow edged, in median area, with the ground colours but darker, the first line oblique on costa, nearly vertical afterwards, but indented outwardly by two short angles on the discal and dorsal

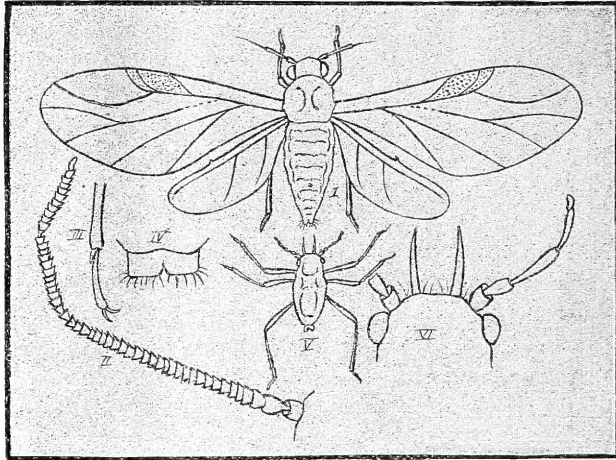


folds; second line very strongly dentate in the middle, indented on the discal and dorsal folds; beneath yellowish-green on the costa, the dorsal half fuscous. Hindwings brownish-grey with a purple tint; the costa tinted with greenish and shining; cilia whitish, a blackish line near the base; beneath paler. Head and thorax brownish-ochreous; the collar tinged with greenish; the thorax darker, tinged with purple. Palpi dark green, the end half of the terminal joint pale ochreous. Abdomen ochreous. Legs greyish-ochreous with greenish tinge; the tarsi brownish black.

[In the figure, which has been prepared by the Museum artist, is shown the moth, natural size, also a section of a custard-apple tunnelled by the caterpillar, half natural size.—*Ed.*]

NOTES ON INDIAN APHIDÆ.

BY G. B. BUCKTON, F.R.S.

Oregma bambusæ,¹ Buckton.

Winged female.—Body wholly black. Head moderate, without marked cornua. Eyes obvious, antennæ, about one-third the length of the body. Five-jointed, the apex minute. The third joint much the longest and more than double the length of the fourth, both these and the fifth joints numerous ringed, as in *Schizoneura*. Rostrum short. Wings ample, membrane rather fuscous. Cubitus with a marked punctured stigma. Cubical vein once forked and not confluent with the cubitus. Lower wings normal. Caudal end bilobed.

The small and younger larval forms have the two cornua below the vertex much produced, as shown in figure VI.

This aphid appears to infest the bamboo throughout British India, the somewhat smaller specimens taken in the North-Western Provinces

¹ This species of *Schizoneurinae* was originally described on page 87 of this volume from specimens of the apterous form taken in Dehra Dun, North-West Provinces. The winged female, which is now described for the first time, was taken by Mr. E. E. Green, upon "the cultivated yellow-stemmed bamboo" in Ceylon. Mr. Green notices that although the apterous form is sometimes so abundant as to completely cover the surface of the bamboo shoots, the plant does not appear to be injured to any very great extent. He adds that in life the wingless form is of a dull state grey colour slightly obscured by a whitish bloom, the gravid females having a cushion of white meal upon the extremity of the abdomen. The winged form, on the other hand, is so dark in colour as to be almost black, and is without any whitish bloom.

do not differ, except in size, from those taken in Ceylon. This difference doubtless is due to moulting and age.

Attention of observers should be turned to conditions of hibernation, and towards deciding the question whether, like some other Schizoneurinae, they descend into the ground.

Expanse of alate form 0·29 millimetres.

Size of apterous form 0·10 millimetres.

The apterous form is figured in Vol. III, p. 87, of these *Notes*.

Fig. I, alate female insect. Fig. II, antenna of the same. Fig. III, tarsus and part of tibia. Fig. IV, caudal end. Fig. V, young specimen of larva. Fig. VI, magnified view of the head with cornua, etc.

MISCELLANEOUS NOTES FROM THE ENTOMOLOGICAL SECTION.
 BY E. C. COTES, DEPUTY SUPERINTENDENT, INDIAN
 MUSEUM.

An interesting longicorn was forwarded through the Madras Museum in November 1892, by the Collector of Kurnool, with the information that it had been noticed cutting rings of considerable depth and about an inch in diameter completely around the branches of a *Tabernaemontana alba* tree. The specimen has been identified through the kindness of Mr. C. Gahan, of the British Museum, as a female of the species *Sthenias grisator*, Fabr. Mr. Gahan notices that the male may be distinguished from the female by a small process projecting obliquely upwards from the base of each of the mandibles in front of the clypeus. He adds that the British Museum possesses a specimen taken more than thirty years ago near Coimbatore which bears a ticket with the following note—"gnaws the bark of shrubs and is very destructive."

The same species was subsequently forwarded to the Indian Museum in January 1893 through the Imperial Forest School. In this case it was obtained by the Deputy Conservator of Forests, Coorg, who wrote:—"These beetles cut off the stem clean in one night.....Large rose trees are thus cut down and destroyed. It is incredible that a small insect like the one I send can do such damage, and I would not have believed it had I not seen their ravages myself.....I got them this morning from off the rose bushes they had destroyed. They attack the main stem and despise smaller branches."

The rose stems forwarded with the insects ranged from three quarters to half an inch in diameter, and were cut completely off with remarkable neatness. The parent insect no doubt girdles the shoot with a view to afterwards laying its eggs above the notch. The habit is one that has been noticed with other species of the same family, and exemplifies the fact that withering trees are the ones most frequented by longicorn borers, the supposition being that a vigorous flow of sap is liable to choke the larva in its burrow.

A good deal of damage was reported in the early part of the rains of 1893 as done to tea in the Darjiling district by a species of case-making caterpillar. The insect was forwarded to the Museum on the 27th June through the

A new Psychid.

Agri-Horticultural Society of India. It proves to be a species of Psychidæ. The larvæ cases are somewhat looser in structure, but very similar both in size and shape to those of the species *Eumeta sikkima*, Moore, which is figured and described on page 63 of volume II of these *Notes*. When received the caterpillars were alive, but no leaves could be procured to feed them with in Calcutta. An attempt was made to rear them upon the leaves of a number of other plants, but they fed very sparingly and did not thrive. Several imagos however, both male and female, were successfully reared. As usual, in the Psychidæ the female is a degraded wingless creature, very much like the female of *Eumeta sikkima*. The male is an active dark-coloured insect, very considerably smaller in size than the male of *E. sikkima*. It is also more uniformly covered with scales. The species is new to the Indian Museum collection, so specimens have been forwarded to London for comparison with the types in the British Museum.⁽¹⁾

Several specimens of a small Ichneumonid parasite, also a single Tachinid fly, emerged in the rearing cage, but have not yet been identified.

Both in 1891 and 1892 damage was reported in the forests of the
Teak-defoliators. Hyderabad Assigned Districts by caterpillars
which defoliated the teak trees.

The specimens, which were forwarded to the Museum through the Forest Department in 1891, could not be identified at the time, as they were immature. They were preserved, however, for further investigation, and careful comparison with authenticated caterpillars since received from Burma shows that the insects in the two cases are identical. The species is the one referred to on page 94 of volume III of these *Notes* under the name of *Faliga damastesalis*, Walker. According to a report furnished by the District Forest Officer of Berar, the insect appeared in the early part of September, but information has not been received upon the subject of the extent of the damage that was occasioned.

In 1892 the insect was a different one. It proves, from the specimens forwarded to the Museum, to belong to the species *Hyblæa pueræ*, Cramer. Injury commenced earlier, and a good deal of damage was done in the beginning of the rainy season. The attack is said to have been very severe in pure patches of teak, but was less noticed in areas where the forest was a mixed one. The trees that were attacked looked quite

⁽¹⁾ The insect has since been identified through the kindness of Mr. G. F. Hampson as *Amatissa consorta*, Templ.

brown amongst the surrounding foliage, and ultimately lost their leaves, but a new flush of leaves soon appeared. When full fed the caterpillars were said to have let themselves down by silken strands and to have formed cocoons in the ground.

The species *Hyblæa puera*, Cramer, has previously been recorded as attacking teak in Lower Burma, as well as in Dehra Dun, North-Western Provinces, and in the Kulsî plantation in Assam, so probably occurs throughout India.

Injury by the caterpillar of the Noctues moth *Achæa melicerte*, Drury, was reported in August 1892 from Dehra Dun in the North-West Himalayas, and in October of the same year from the Cuddapah district in Madras.

In the case of Dehra Dun a considerable amount of damage was done both to tallow trees (*Sapium sebiferum*) and to tea. The caterpillars appeared shortly before the commencement of the rainy season and began by eating the leaves of the tallow trees. When these were stripped they let themselves down on to the tea bushes beneath and attacked them in a similar manner. Specimens were forwarded both from the Forest School and from Mr. Leslie Rogers. The latter noted that the caterpillar stage occupied from fifteen to twenty days and the pupal stage about ten days. The insect seems to have disappeared almost as suddenly as it came.

In the case of the Cuddapah district the insect was reported as doing a good deal of damage by defoliating castor-oil plants. The specimens from which the identification of the species was determined were furnished to the Museum through the Collector's office.

Mr. F. A. Skuse, of the Australian Museum, Sydney, who has made a special study of Nemocera, has lately examined some specimens forwarded to him from the Indian Museum of the common brown mosquito of Calcutta. He identifies the species as *Culex pipiens*, Linn, said to have been introduced from Egypt, and now occurring throughout Australia, America, New Zealand and the old world. The fact is of interest, as the Indian form does not appear to have been previously identified with certainty. Representatives of the striped black and white mosquito, which is almost as great a nuisance in the day time, in Calcutta, as the brown mosquito is at night, have been forwarded to Mr. Skuse for favour of identification.⁽¹⁾

(1) It has since been determined by Mr. Skuse as a new species of *Culex* for which he proposes the name *C. albopictus*. His description will be published in a subsequent number of these *Notes*.

In March 1893 caterpillars were forwarded to the Museum by the Deputy Commissioner of Betul, Central Provinces. They were reported as having proved destructive to gram⁽¹⁾ during the cloudy weather, which had been prevalent in the district. The material proves insufficient for precise identification, but the insect is one of the Noctues. It may be noticed that the caterpillars of the species *Heliothis amigera*, Hübn., sent to the Museum in 1889 from Patna, where they had been attacking *Lathyrus sativus* plants, are very similar in general appearance, though somewhat differently marked. They also tunnelled into the pods very much in the same manner. It is probable, therefore, that the two forms are somewhat nearly related to each other, though they are likely to represent distinct species.

An imago of the insect referred to in volume I, page 198 of these Notes, as occasioning a considerable amount of damage by boring into teak trees in Travancore, was forwarded to the Museum in March 1893, by Mr. T. F. Bourdillon, who had successfully reared it from the caterpillar. The insect proves to be a Bombyces moth related to the family Cossidæ, but it is new to the Museum collection, so has been forwarded to Mr. F. Moore, who has made a special study of Indian Macrolepidoptera.⁽²⁾

According to an interesting note furnished by Mr. Bourdillon, the perfect insect would seem to emerge in the dry weather about March, and to lay its eggs shortly afterwards, for the borers are found from May onwards. Large caterpillars are also in some cases found at other times of the year, so it is likely that more than one season is sometimes passed in this stage. It is only softened, unhealthy wood that affords lodgement for the borer. Healthy trees appear to be quite free from its attack.

In August 1892 specimens were forwarded by the Officiating Magistrate of Saran of an insect, known as "*Sapta*," A Hesperid caterpillar injuring paddy. said to have been causing much mischief to young paddy plants. The imago was reared in the Museum and proved to be a Hesperid butterfly. The specimens have been kindly examined by Mr. L. De Niceville, author of the *Butterflies of India*, who identifies them with some doubt as belonging to the species *Parnara colaca*, Moore. The excessive multiplication of this species appears to be somewhat unusual.

⁽¹⁾ Probably *Cicer arietinum*.

⁽²⁾ It has since been examined by Mr. Moore who identifies it as allied to his *cosus caâmbæ*, Moore.

Defoliation of orange and lemon trees in Dehra by the caterpillar of the butterfly *Papilio polytes* was reported from the Forest School in October 1892, and is worthy of record as confirming the observation that the injury to these plants is not confined to the one species *Papilio erithonius*, Cram. The identity of the species was ascertained by comparison with a carefully-named series of Indian butterflies presented some years back to the Forest School by the Trustees of the Indian Museum.

Specimens of a large wood-boring insect, which has been identified as the Cerambycid *Neocerambyx holosericeus*, Longicorn-borers in the Punjab. Fabr., were forwarded in December 1892 by the Director of Land Records and Agriculture, Punjab. They were procured by the Deputy Commissioner of Dera Ismail Khan in November 1892. According to the account furnished, the insect is to be found in trees growing in dry places and specially in the "Farash⁽¹⁾" but also in the "Sarin⁽²⁾" and "Kikar⁽³⁾." It is known as *Dain* in Hindi and *Raniah* in Pushtu. It generally attacks the trunk near to the ground, but the branches also suffer occasionally. The affected portion of the tree can usually be recognized by a swelling in the bark.

The species has previously been sent to the Museum as associated with other Cerambycidae in attacking young teak trees in the Kuli plantation of Assam, so is likely to frequent many kinds of wood.

A longicorn-borer, received from the Conservator of Forest, Berar, was forwarded to the Indian Museum in July 1892 by the Director of the Imperial Forest School, with the information that it does considerable damage to babul (*Acacia arabica*) plants. The larva is said to enter the stem some three or four inches above the ground, and to tunnel through the root to such an extent as eventually to cause death. The species is new to the Museum collection of Cerambycidae; it would seem to be nearly related to the genus *Celosterna*, but has been sent to Europe for further examination.⁽⁴⁾

(1) *Tamarix articulata*?

(2) Botanical name not ascertained.

(3) *Acacia arabica*.

(4) It has been kindly examined by Mr. C. J. Gahan of the British museum, who identifies it as rather a small male example of the species *Celosterna (sic) svinator*, Fabr. Mr. Gahan notices that this species should be placed as a variety of *C. scabrator*, Fabr., which only differs in having the pubescence of the elytra more tawny or brownish in colour.

In April 1893 information was called for upon the subject of the
The preservation of books from insects in India. destruction of books by insects in Calcutta, and as the matter is one of general interest, it may be useful to notice what was ascertained. The most troublesome insect in Calcutta libraries appears to be a minute Ptinid beetle, which agrees with the description of the species *Sitodrepa panicea*, Linn. This cosmopolitan book-maggot drills pin holes through and through the cover and body of a book, and often completely disintegrates it. The only other insects which have been noticed as causing any considerable damage are white ants (*Termes* sp.) and cockroaches (*Periplaneta americana*, Deg.). They first devour the books wholesale, but are easily prevented from gaining access to them by placing the shelves upon the stone insulators commonly in use, while the second merely deface the bindings, so are of less importance.

The treatment recommended for use in the library of the Revenue and Agricultural Department was that of disinfecting the books by pouring a few teaspoonfuls of refined mineral naphtha, or what is known as benzine collas, into the crevices of the binding, and then shutting up the volume for a few days in a close-fitting box to prevent the escape of the fumes. Books so dealt with to be afterwards sponged over lightly with a very little of the finest kerosine oil, which should be rubbed off with a cloth before it has time to penetrate into the binding. This renders the books to a great extent distasteful to insects without causing serious injury. It is objectionable on account of the odour of the kerosine oil, but has the recommendation of harmlessness combined with considerable efficiency.

Particulars have since been obtained, through the kindness of the Superintendent of the Royal Botanical Gardens, Sibpore, of a system which has been adopted for preserving books in that institution. The treatment has been in use for a number of years, apparently without accident, and Dr. George King reports very favourably upon its effects. It consists in brushing the books over with a saturated solution of corrosive sublimate made by constantly keeping a few lumps of the poison at the bottom of the jar of alcohol (presumably the ordinary methylated article which has a strength of about seventy or eighty per cent.), so that the maximum amount may be absorbed. Great care should of course be taken in handling the corrosive sublimate on account of its exceedingly poisonous nature.

It may be useful to add that in the Indian Museum Library, where the books are kept in close-fitting glass-cases with a few ounces of naphthaline upon each shelf, little or no damage is caused by insects. From a note furnished by Mr. R. Chapman, late Librarian, it appears that the paste used in binding the Indian Museum books is poisoned by

adding about half an ounce of sulphate of copper to each lb of paste, while books already infested are disinfected by shutting them up for four or five days in a close-fitting box of loose naphthaline with as much of this substance as possible between the leaves.

The following insects found attacking groundnut plants (*Arachis hypogæa*) in the neighbourhood of Panruti, South Arcot, were forwarded to the Museum in October 1892 by the Deputy Director, Land Records and Agriculture, Madras:—

- (1) *Múdupúchi*.—This insect is said to be the most serious pest. It affects large areas and materially arrests the growth of the plant. A good shower of rain appears to remove it. Further information is promised. The specimens forwarded comprise larvæ and pupæ of a microlepidopterous insect which cannot be determined precisely without an examination of the imago.
- (2) *Verpúchi*.—This insect is said to occur only in isolated patches, and is chiefly injurious in times of drought. It devours the fibrous roots of the groundnut plant and bites off the end of the tap root. Plants attacked by it are killed outright. It occurs in most fields, but is not common. The Shiyali taluq, where groundnut cultivation is comparatively recent and the soil sandy, is said to be to a great extent exempt from it. The pupal case of what would seem to be a Noctues moth was forwarded in connection with this insect, but the material is insufficient for the determination of the species.
- (3) *Kambilipuchis*.—These insects are said to appear in large swarms in times of drought. They pass *en masse* from field to field completely defoliating the plants. An imago was reared in the Museum from a pupa forwarded, and proves to be an Arctiid moth of the genus *Aloa*. The specimen differs in markings, and is somewhat smaller in size than the typical *Aloa lactinea*, Cramer, but is likely to be merely a somewhat abnormal representative of this common defoliating species.
- (4) *Pachaipulu*.—This insect is said to devour the leaves of the groundnut plant, but is usually rare. The material proved insufficient for determination.
- (5) *Kalippuchi*.—This insect is said to defoliate groundnut plants to a small extent, also to commit serious ravages on raggi and gingelly crops. The specimen forwarded is an Acridid grass-

hopper of the genus *Crotogonus*, which is a common pest throughout India.

To the above may be added an insect known locally as *Elapuchi* reported as having caused some very slight damage by eating the leaves of groundnut plants in Villupuram (South Arcot) in September 1892. The specimens forwarded to the Museum by the Deputy Director of Agriculture, Madras, consisted of Curculionidæ beetles belonging to a species which seems to be allied to the genus *Episomus*. The insect is as yet undetermined in the Museum collection, and has been sent to Europe for further examination.⁽¹⁾

Specimens of an ant belonging to the genus *Cremastogaster* were sent to the Museum in January 1893 by Mr. E. E. Green, of Ceylon, with the information that it had proved very troublesome in cinchona and coffee plantations. The insect was forwarded to Prof. A. Forel, who has kindly examined it, and who identifies the species as *Cremastogaster dohrni*, Mayr.

The following particulars are taken from an interesting note furnished by Mr. E. E. Green :—The ants construct their large dark-brown nests—sometimes more than two feet in diameter—on the stems of the cinchona and Grevillea trees, or on the branches of the coffee, and resent intrusion. They have no stings, but the bites they inflict are so severe that it is almost impossible for coolies to work in the immediate neighbourhood. The nest seem often to be originally started around a colony of plant lice, either of the species *Lecanium coffeæ* or *Dactylopius adonidum*. The presence of the ants causes a good deal of damage to the trees, as the portion above where the nest is situated often dies off, the branches below remaining unaffected. The breaking up of a nest only disperses the colony and increases the evil, for in a very short time a number of smaller nests take the place of the original.

Amongst the Scarabæidæ forwarded to the Museum since the issue of the last number of these notes, may be noticed :—

- (1) Imagos of the species *Serica pruinosa*, Burm. (Melolonthini), forwarded in June 1892 from Devikulam, 5,000 to 6,000 feet in the Madura district of the Madras Presidency, by Mr. A. W. Turner. The insect is reported to have done a considerable amount of damage by defoliating coffee bushes.

⁽¹⁾ It has since been identified through the kindness of Mons. Desbrochers des Loges, who determines it as *Episomus crenatus*, Dej.

- (2) Images of the species *Clinteria confuis*, Hope, forwarded in July 1893 by Mr. E. J. Buck. The insect was noticed as attacking peach and apricot trees in Simla.

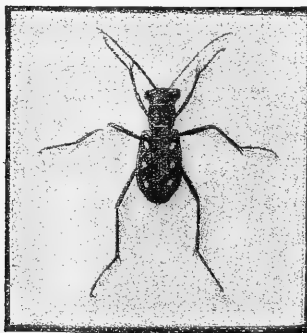
Workers of the ant *Dorylus longicornis* were forwarded in October 1892 by Mr. E. E. Green, with a suggestion that this species might possibly be the one referred to on page 42 of volume II of these *Notes* as attacking potatoes.

Specimens of a small red ant, which appears to be identical with the workers of the species *Monomorium basale*, Smith (Myrmecidæ), as determined in the Museum collection, were forwarded in April 1893 by the Deputy Commissioner, Betul, Central Provinces, with the information that they had multiplied to such an extent in the town of Badmir as to have become a great nuisance to the people.

The Curculionid referred to in volume II, page 12 of these *Notes*, as attacking young opium plants in the North-West Provinces, has been identified through the kindness of Mons. J. Desbrochers des Loges as belonging to the species *Tanymecus indicus*, Faust., MS.

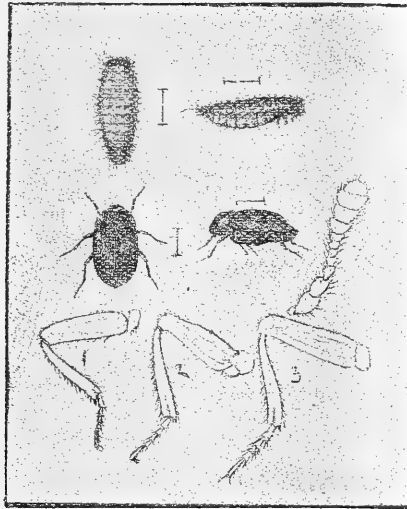
In March 1893 imagos of the Dermestid *Anthrenus vorax*, Waterhouse, which has previously been noticed as attacking skins in the Museum, were forwarded by Mr. L. de Niceville, with the information that they had proved destructive to some of the fittings in railway carriages on the Great Indian Peninsula Railway.

Indeterminable chrysolimid larvæ were forwarded in July 1892, by Babu N. G. Mukharji, as attacking potato plants in Berhampore.

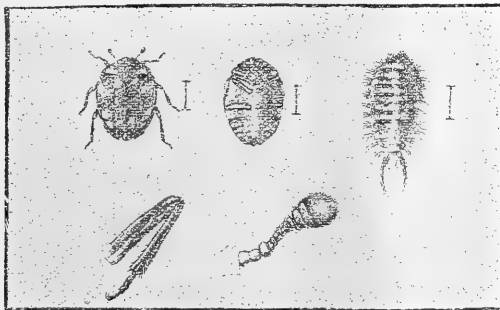


The above figure represents the tiger beetle *Cicindela serripunctata* Fabr., natural size. This insect is referred to in volume I, page 59, volume II, page 148, and volume III, page 17, of these *Notes*. It

is a predaceous species, and is said to perform useful service in destroying the rice sapper *Leptocorisa acuta*, which does an enormous amount of damage to paddy (*Oryza sativa*) throughout India.

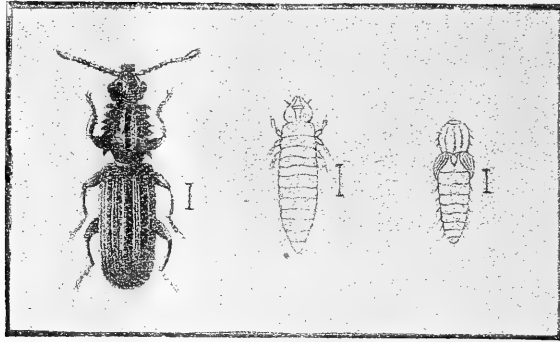


The above figure represents the larva and imago, both somewhat enlarged, of the Dermestid *Athriostoma undulata*, Motsch. Below the imago are much enlarged diagrams of the antenna and of the first, second and third pairs of legs, the latter numbered 1, 2, and 3, respectively. The natural size of the insect is shown by hair lines. This species is referred to in these *Notes*, volume I, page 61, volume II, page 48, and volume III, page 23. It is known as *Kapra* in the Delhi bazar, where it is said sometimes to destroy as much as six or seven per cent. of wheat stored in godowns.

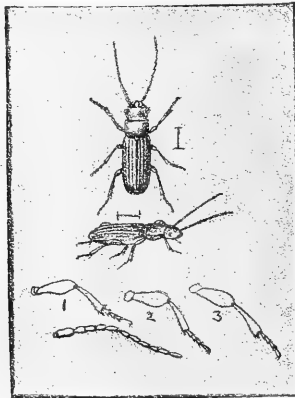


The above figure represents the larva and imago, both enlarged, also

much magnified diagrams of the antenna, and one of the legs of the Dermestid *Anthrenes vorax*, Waterhouse. The natural size of the insect is shown by hair lines. This species is referred to in these *Notes*, volume I, page 208, and volume III, page 118. It attacks skins and leather of all kinds, and is a troublesome Museum pest in India.

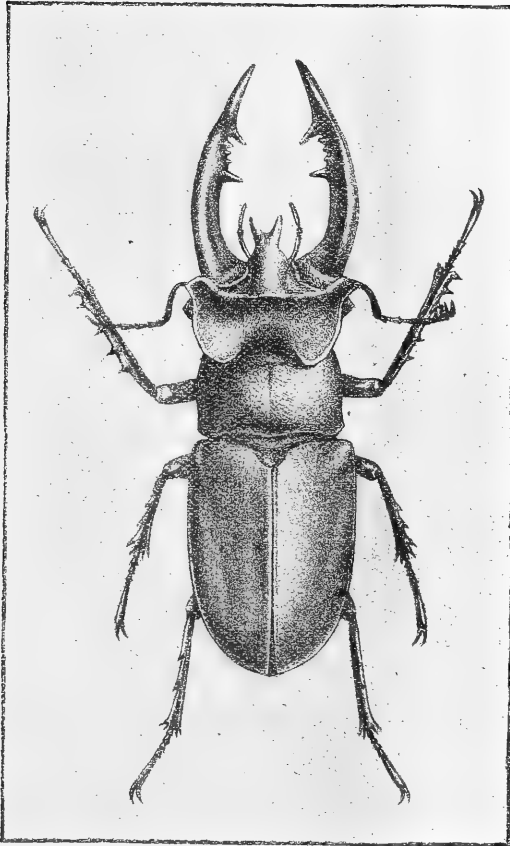


The above figure, which is after Curtis, represents the larva, pupa, and imago of the Cucujid *Silvanus surinamensis*, Linn. The natural size of the insect is indicated by hair lines. This species is referred to in these *Notes*, volume I, page 60, and volume II, page 148. It is a common warehouse pest in India, where it has been noticed as attacking both dried fruit and also farinaceous substances.

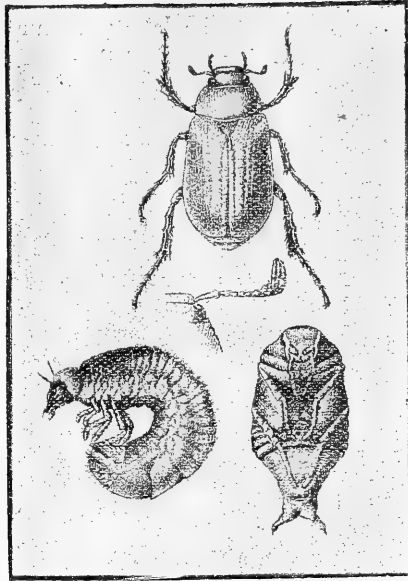


The above figure represents the imago of the Cucujid *Læmolphæus*

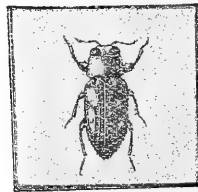
pusillus, Fabr. The natural size of the insect is indicated by hair lines. Below are given enlarged diagrams of the antenna and of the first, second, and third pairs of legs. The latter are numbered 1, 2, and 3, respectively. The species has been reported as attacking ships' biscuit in Calcutta, and seems to be a common warehouse pest.



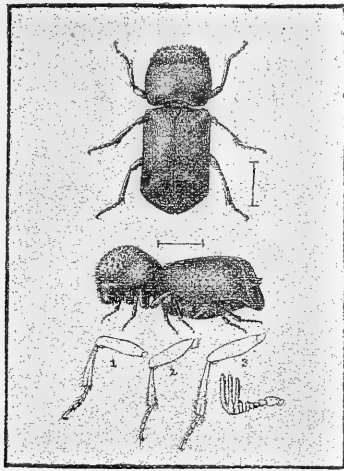
The above represents the Lucanid *Lucanus lunifer*, Hope, male, natural size. This insect is referred to in volume II, page 148 of these *Notes*. It has been reported as destructive to oak trees in the Himalayas.



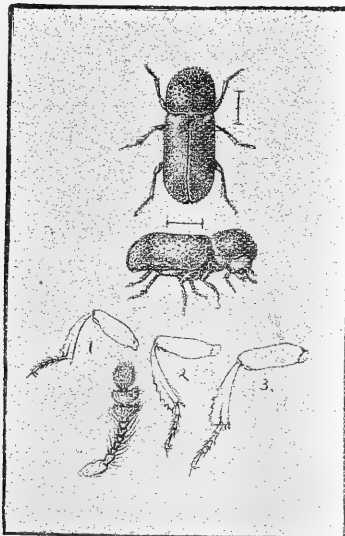
The above represents the Melolonthid, *Lachnosterna impressa*, Burm., in various stages of development, all natural size, also the side of the head in the imago, enlarged, to show the structure of the antenna. This species has been reported as extremely destructive in tea gardens in Sikkim. It is referred to in these *Notes*, volume I, page 59, volume II, page 149, and volume III, page 3.



The above is the Buprestid *Chrysobothris sexnotata*, Gory, natural size. Its larvæ are said to bore into sâl timber. *Vide* these *Notes*, volume II, page 149.



The above is a species of Ptinidæ, probably belonging to the genus *Sinoxylon*. It has been reported as tunnelling into the wood of the tree *Terminalia belerica*. The figure shows the imago enlarged, also much magnified diagrams of the antenna, and first, second, and third pairs of legs. The latter are marked 1, 2, and 3, respectively. The insect is noticed in these *Notes*, volume III, page 22.

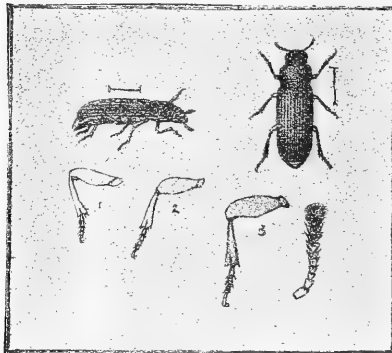


The above represents the destructive bamboo borer *Dinoderus* sp. (*Ptinidæ*). The figure shows the imago enlarged, also much magni-

fied diagrams of the antenna and first, second, and third pairs of legs, the latter numbered 1, 2, and 3, respectively. The natural size of the insect is shown by hair lines. The species is referred to in these *Notes*, volume I, page 43, and volume II, page 150.

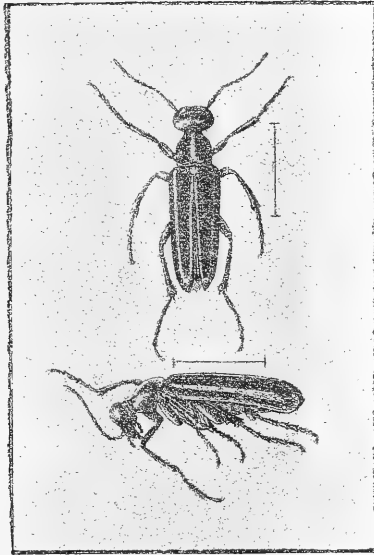


The above represents the imago of the Ptinid *Rhizopertha pusilla*, Fabr., enlarged, also much magnified figures of the legs and antenna. The natural size of the specimen delineated, which was obtained from Sialkot wheat, is indicated by a hair line. The insect attacks wheat, cholam seed, and other farinaceous matter. It is referred to in these *Notes*, volume I, page 60, and volume II, pages 27 and 150.

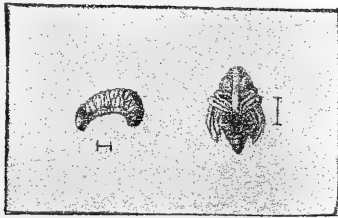


The above represents the Tenebrionid *Tribolium ferrugineum*, Fabr. The figure shows the imago enlarged, also much magnified diagrams of the antenna and first, second, and third pairs of legs, the latter marked 1, 2, and 3, respectively. The natural size of the insect is indicated by

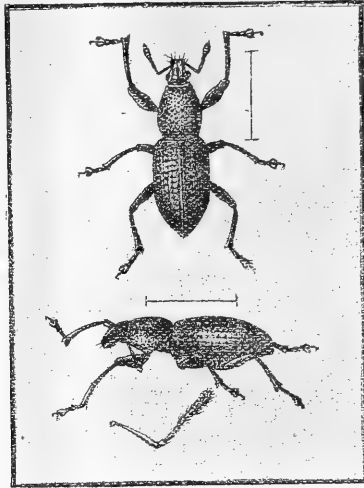
hair lines. The species is a common museum and warehouse pest in India. It is referred to in these *Notes*, volume I, page 60, and volume II, page 150.



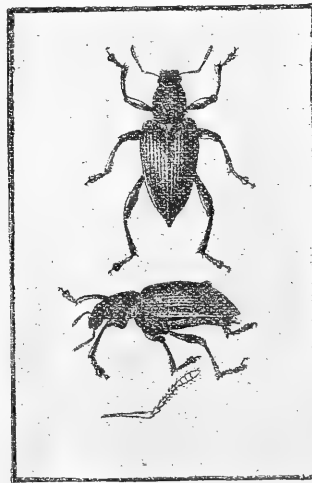
The above represents the imago of a Cantharid beetle, which has been reported as attacking crops in Meerut. It has not yet been identified. The natural size of the insect is indicated by hair lines.



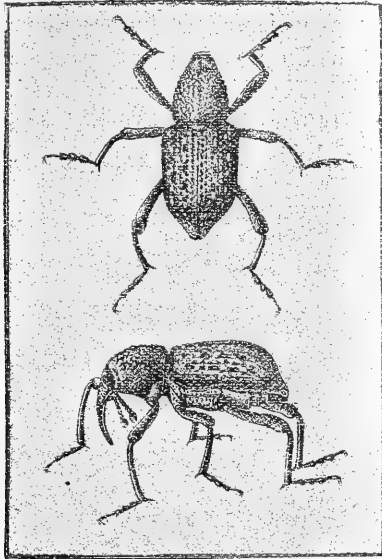
The above represents the larva and pupa, both enlarged, of the Curculionid *Apion strobilanthes*, Desbroch. The natural size of the specimens is indicated by hair lines. This insect is referred to in these *Notes*, volume II, pages 32 and 151, the imago being figured on page 32. It attacks the plant *Strobilanthes pectinatus* in Sikkim.



The above represents the imago of the Curculionid *Astycus lateralis*, Fabr., enlarged, with much magnified figure of the antenna. The natural size of the insect is indicated by hair lines. The species is referred to in these *Notes*, volume I, page 58, and volume II, page 151. It has been reported as attacking various plants in different parts of India.



The above represents the Curculionid *Astycus chrysochloris*, Wied., natural size, with magnified figure of the antenna. This insect has been reported as attacking tea plants in Cachar. It is referred to in these *Notes*, volume III, page 99.

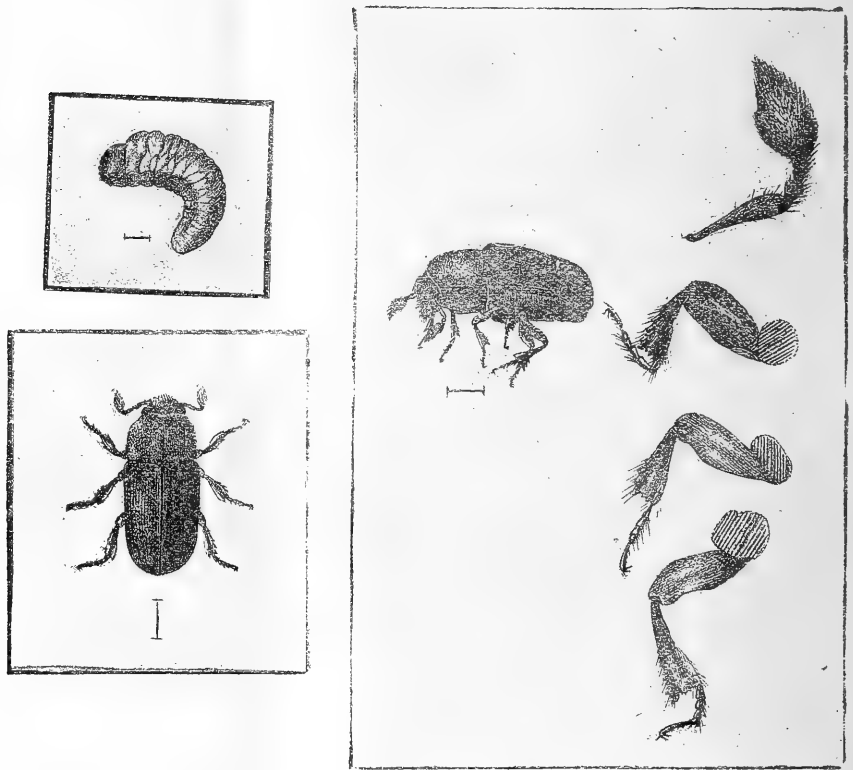


The above represents the imago of the Curculionid *Sipalus granulatus*, Fabr., natural size. This insect is referred to in these *Notes*, volume II, page 151. Its larvæ are said to bore into *Butea frondosa* timber.

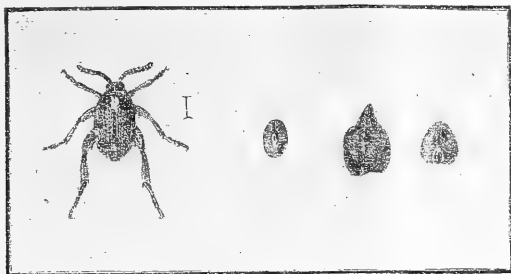


The above is reduced from a figure in Mr. H. N. Ridley's report on

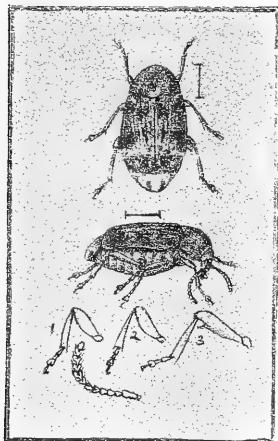
the *Destruction of Coconut palms by Beetles*, Singapore, 1889. It shows the dilapidated appearance which a coconut estate presents when suffering from the attack of the beetles *Rhynchophorus ferrugineus*, Oliv., and *Oryctes rhinoceros*, Linn. These insects are referred to in these *Notes*, volume II, pages 8, 9, 149, and 151, the various stages of *Rhynchophorus ferrugineus*, Oliv., being figured in volume II, page 8.



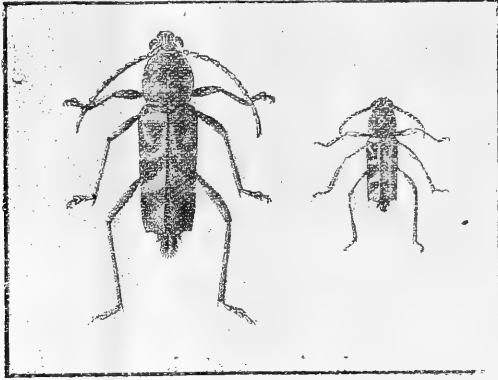
The above represents a species of Scolytidæ belonging to the genus *Polygraphus* (allied to *P. pubescens* cf. Europe), which has been reported as tunnelling into the bark of *Pinus excelsa* trees in the North-West Himalayas. The figures show the larva and imago enlarged, also much magnified diagrams of the antenna and legs of the beetle. The topmost leg is the front one.



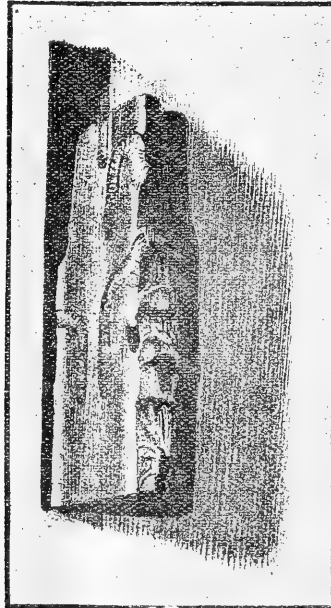
The above represents the imago of the species *Bruchus chinensis*, Linn., enlarged, also the seeds (natural size) of various leguminous plants it attacks. The natural size of the insect is indicated by a hair line. The species is referred to in these *Notes*, volume I, page 209, volume II, page 152, and volume III, page 25.



The above represents a beetle which has been identified as *Bruchus emarginatus*, Allard. Var. The figure shows the imago enlarged, also much magnified diagrams of the antenna and first, second, and third pairs of legs, the latter numbered 1, 2, and 3, respectively. The insect attacks the seed of the *Pisum sativum* plant. It is referred to in these *Notes*, volume I, page 209, and volume II, page 152.

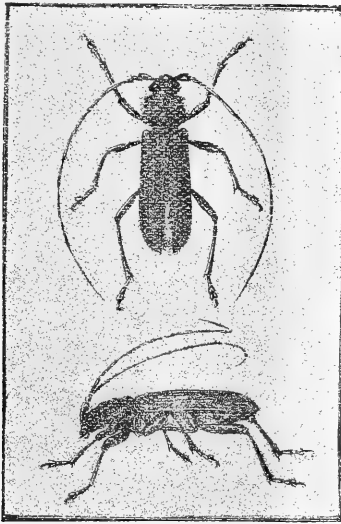


The above represents the imago of the longicorn *Xylotrechus quadrupes*, Chev., both natural size and enlarged. Its larva does much damage by tunnelling into the stems of coffee bushes. The insect is referred to in these *Notes*, volume I, page 61, and volume II, page 153.

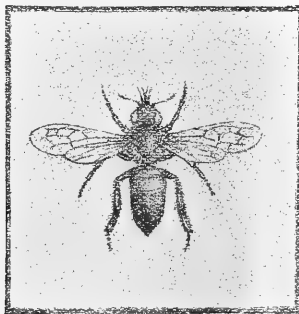


The above represents a block of sâl timber, one-seventh natural size, which has been tunnelled by the larvæ of the Longicorn *Ploceoderus*

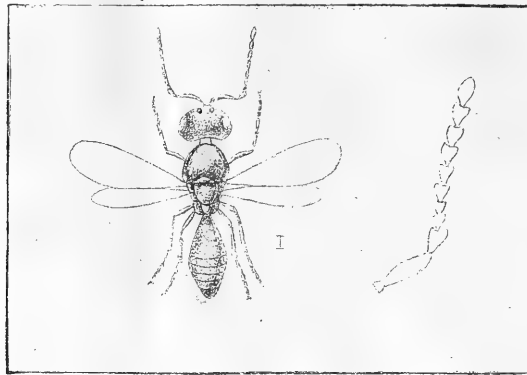
obesus, Gahan = *P. pedestris*, Cotes. This insect is referred to in these *Notes*, volume I, pages 60 and 91, and volume II, page 153.



The above represents the imago of the Longicorn *Stomatium barbatum*, Fabr., natural size. The specimens delineated were reared from khair wood. The species has also been recorded as attacking teak and other timber. It is referred to in these *Notes*, volume I, page 59, and volume II, pages 12 and 153.



The above represents a worker, natural size, of the jungle honey bee *Apis dorsata*, Fabr. This insect builds large single combs in the open, and stores considerable quantities of inferior honey. It is referred to in these *Notes*, volume II, page 39.



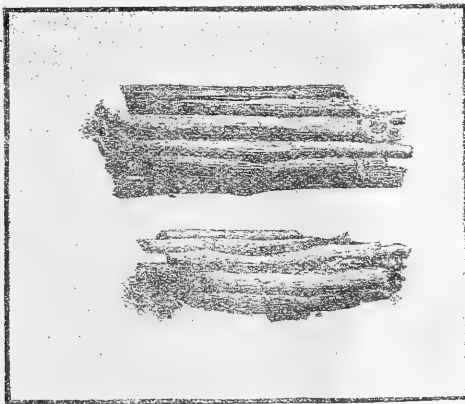
The above figure, after Cameron (Mem. Proc., Manchester Lit. and Phil. Soc., vol. IV, 1890) represents the Proctotrupid *Platygaster oryzae*, Cameron, referred to in these *Notes*, volume II, page 156. The natural size of the insect is indicated by a hair line. To the right is a much enlarged diagram to show the structure of the antenna.



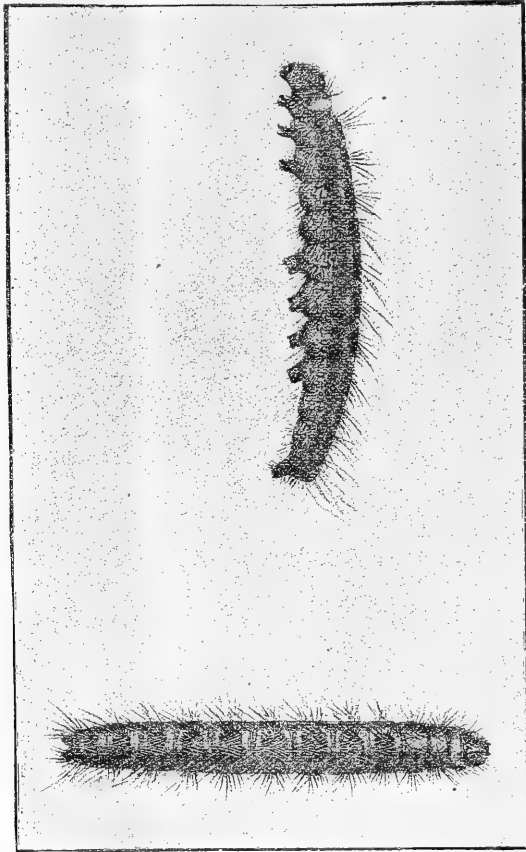
The above figure after Cameron (Mem. Proc. Lit. Philos. Soc., volume IV, 1890) represents the minute Chalcid *Aphelinus theae*, Cameron, referred to in these *Notes*, volume II, page 155. The insect is less than half a millimetre in length. To the right is a much enlarged diagram to show the structure of the antenna.



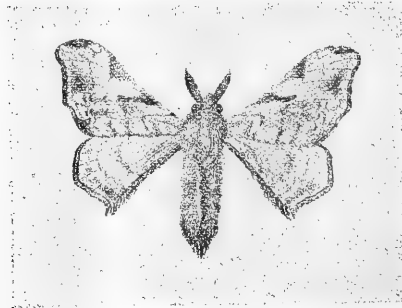
The above represents a section of the trunk of a young poplar tree from Baluchistan, one-tenth natural size, to show the tunnels made by the larva of the Aegeriid moth *Sphecia ommatiformis*, Moore. This insect is referred to in these *Notes*, vol. II, pp. 14 and 156.

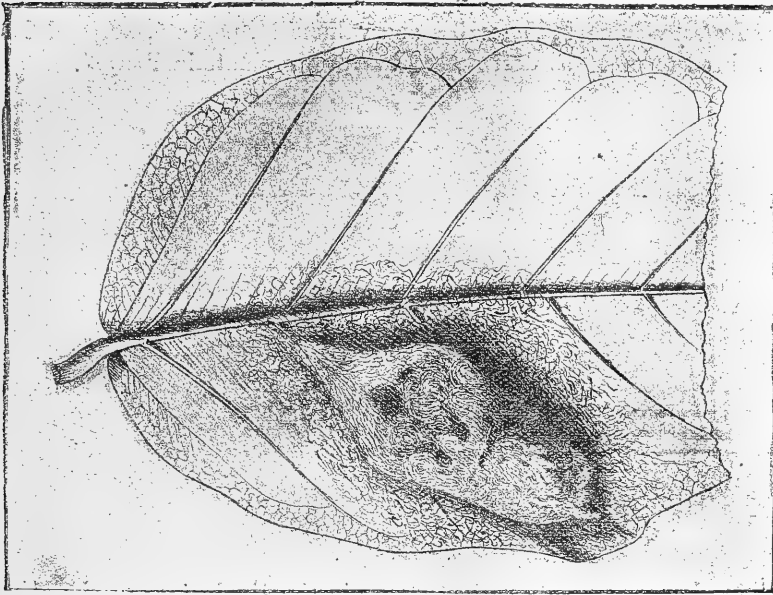


The above represents the larval case, natural size, of the bag worm *Eumeta crameri*, Westw., which defoliates tea and other plants. The insect is referred to in these *Notes*, volume I, page 204, and volume II, page 157.

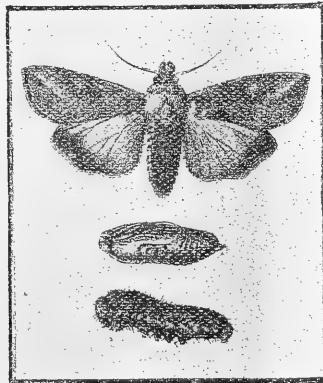


The above represents the caterpillar (natural size) of the species *Spalyria minor*, Moore, which has been reported as defoliating various plants in Burma. The insect is referred to in these *Notes*, volume II, page 159, and volume III, pages 20 and 89. Figures of the imago, male and female, appeared in volume III, page 89.



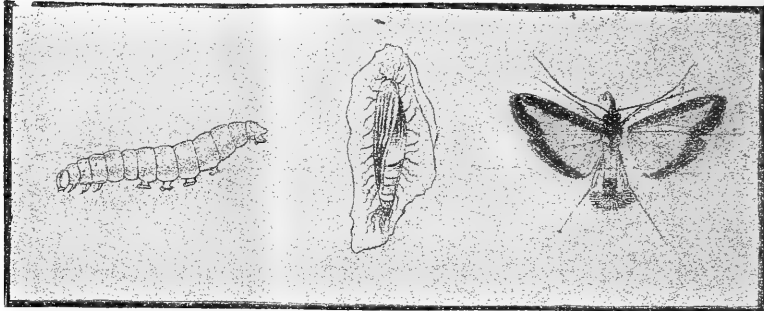


The above represents the male moth, also part of a leaf with pierced cocoon, both natural size, of the wild silk moth *Aristhala sikkima*, Moore. This insect is referred to in these *Notes*, volume II, page 89. It has since been forwarded to the Museum from Cachar, where it was found attached to the leaves of the peepul tree (*Ficus religiosa*). The cocoon is glistening white in colour, in shape and structure not unlike the cocoon of a polyvoltine mulberry silk worm, and containing a good deal of remarkably fine silk.

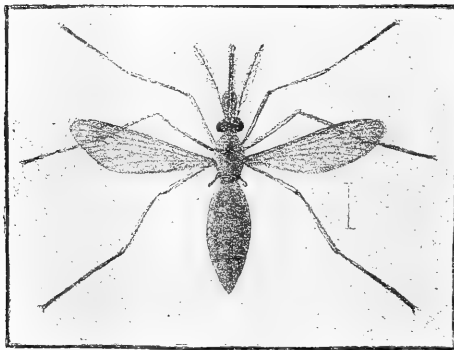


The above represents the Noctuid *Leucania extranea*, Guen., in various

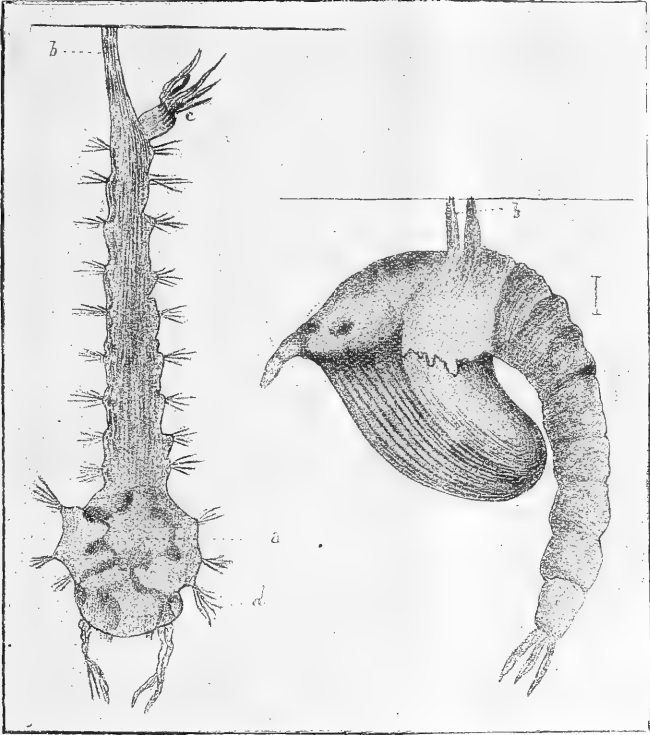
stages of development, all natural size. This insect is referred to in these *Notes*, volume I, page 103, and volume II, pages 5, 10, and 160. It has been reported as destructive to various plants in Bengal.



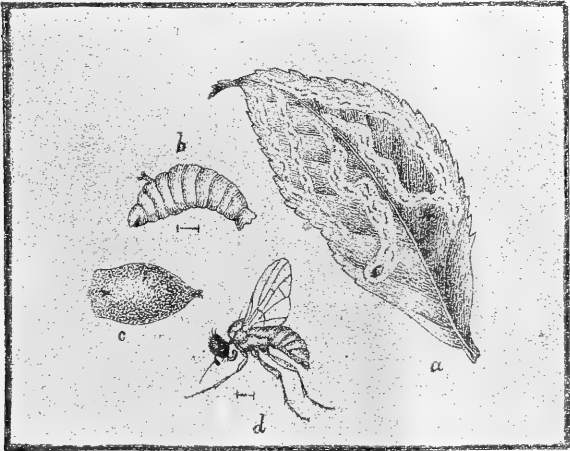
The above represents various stages in the life history of the Microlepidopterous insect *Eudiotles indica*, Saunders (after Saunders figures Trans. Ent. Soc., Lond., 1850-51). The species was described as defoliating cotton plants in Java, and is likely also to occur in India. It is referred to in these *Notes*, volume II, page 162.



The above represents the female imago enlarged, of the brown mosquito (*Culex pipiens*, Linn.). This insect is referred to in these *Notes*, volume III, page . The natural size is indicated by a hair line.

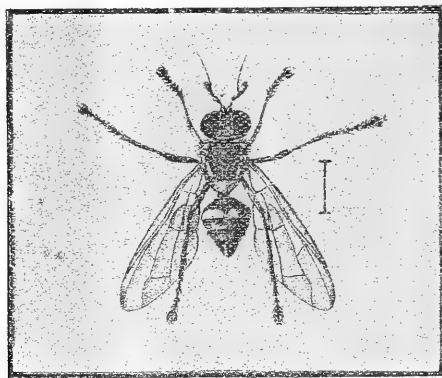


The above represents the larva and pupa, much magnified, after Gilchrist of the species *Culex pipiens*, Linn.

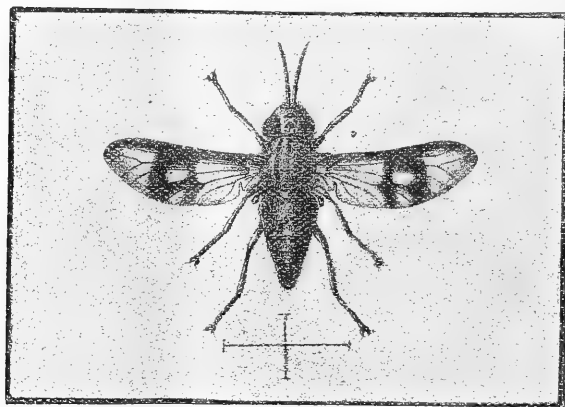


The above is from a drawing furnished by Mr. E. E. Green of

Ceylon. It represents the tea leaf miner *Oscinis theae*, Bigot. The following is an explanation of the figure:—a, tea leaf reduced, to show the tunnel made by the larva; b and c, larvæ enlarged; d, imago enlarged. The natural size of the insect is indicated by hair lines. The species is referred to in these *Notes*, volume I, page 204, and volume II, page 165.

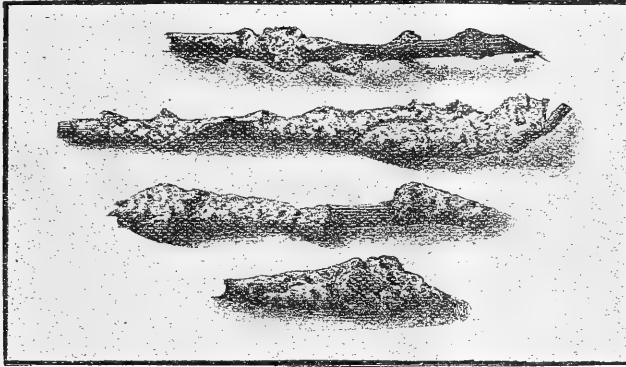


The above represents the imago of the Muscid *Rivellia persica*, Bigot. The larva of this insect have been reported as attacking peaches in Chota Nagpur. The species was first described in these *Notes*, volume I, page 192. Notes on its life, history appeared in the same volume, page 195. The natural size of the insect is indicated by a hair line.



The above represents the imago of the Tachinid *Chrysops dispar*, Fabr., which has been reported as troublesome to cattle in Baluchistan.

The insect is referred to in these *Notes*, volume II, page 10., The natural size is indicated by hair lines.

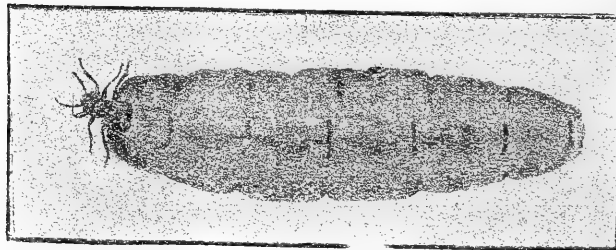
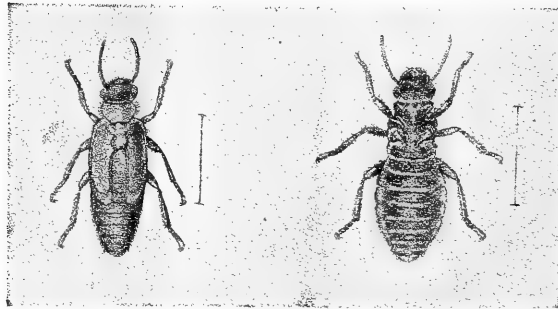
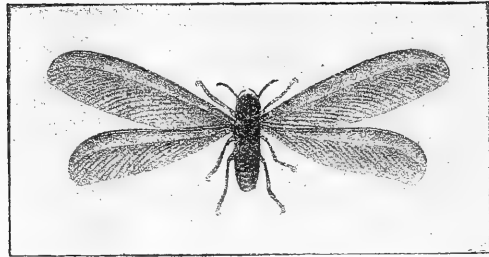
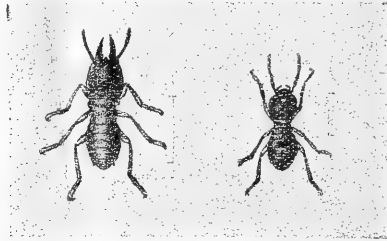


The above represents apple twigs, one-third natural size, from the Nilgiri Hills, showing the curious excrecences produced by the attack of the Aphid *Schizoneura lanigera*, Hausmann. This insect is referred to in these *Notes*, volume I, page 208, and volume II, pages 13, 52, and 167.



The above shows the result of the attack of the Green Fly Blight

Chlorita flavescens, Fabr., upon tea shoots. All the figures are drawn half natural size. The sprig marked (a) is an ordinary healthy tea shoot, while those marked (b) are shoots of the same age but suffering from the attack of the *Chlorita*, which dwarfs their growth and renders them useless for tea making. The insect is referred at length in these *Notes*, volume III, page 9.



The above represents various stages in the life-history of the common white ant of Lower Bengal, *Termestaprobanes*, Walker. The first block represents the soldier with large mandibles, also the worker with small mandibles: the natural size in each case is indicated by a hair line. The second block represents the winged form natural size. The third block represents the full grown larva with budding wings, also the fertilised female after it has dropped its wings and returned to the nest, but before its abdomen has expanded to any very considerable extent. The natural size in each case is indicated by a hair line. The fourth block represents the female, natural size, after it has attained its full growth in the nest. The species is referred to in these *Notes*, volume II, page 172, and volume III, page 23.



